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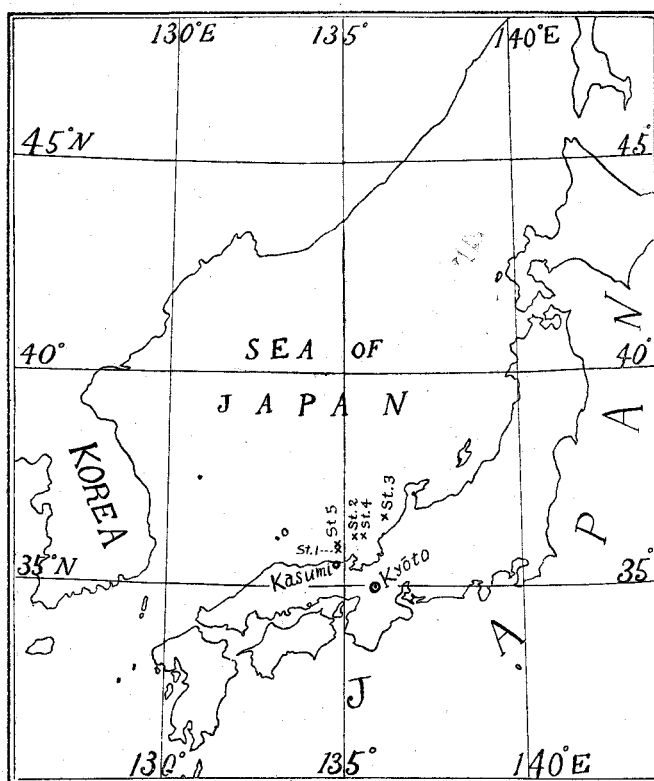
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NOTES ON SOME ANIMAL PLANKTONS COLLECTED FROM THE SEA OF JAPAN OFF SAN'IN-DISTRICT

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With a Map and 2 Tables

Several plankton samples were collected by the R.M.S. "Kuroshio-maru" of Maizuru Marine Observatory at a station in the Sea of Japan 20 miles off Kasumi, a little town in San'in district shown in the map, in May of 1951. Examining this material, I found a great number of cold water plankton ani-



mals in samples hauled from 310 m to the surface, while there were found only warm water forms living in Tsushima Current in samples hauled in the surface layer shallower than 50 m. The same phenomenon was also observed on samples collected at stations 20-30 miles off San'in district during the period from June to August in the same year.

These observations seem to suggest the existence of the flow of the so-called "inherent water of Japan Sea" under the warm water of Tsushima Current. And so, it may be very interesting to describe on the composition of zooplankton and give notes on some cold water plankton animals found during these surveys.

These plankton samples were hauled up from the deeper layer by a large closing net which was designed to catch the macroplankton living in deep water, 50 cm in diameter, 2 m in length and stretched with MÜLLER's gauze No. 5.

The composition of zooplankton will be shown in Table 1, and that of Copepoda which occupies a great part of zooplankton will be shown in Table 2.

Table 1. Composition of Zooplankton. (% to the whole zooplankton)

Station	St. 1	St. 2	St. 3	St. 4	St. 5
Lat. (N) Long. (E)	36-00.0 134-40.0	36-03.0 135-13.0	36-39.0 135-46.0	36-16.4 135-27.8	36-09.6 134-40.0
Date	May 25	June 21	July 18	July 31	Aug. 2
Haul. Depth (m)	310-0	300-140	400-320	400-230	500-255
Hydromedusae	0.2	3.7	7.7	1.2	1.4
Copepoda	87.8	78.3	88.3	93.8	84.2
Ostracoda	3.6	0.5	—	—	8.2
Schizopoda	0.8	—	1.4	1.8	3.3
Amphipoda	0.1	0.0	0.1	1.0	1.1
Pteropoda	2.9	4.8	1.4	0.5	—
Chaetognatha	0.3	0.0	0.3	0.0	0.3
Tunicata	4.3	11.1	1.4	0.0	0.0
Others	—	1.6	—	1.7	1.5

Table 2. Composition of Copepoda. (% to the whole Copepoda)

Station	St. 1	St. 2	St. 3	St. 4	St. 5
<i>Calanus plumchrus</i>	0.3	0.6	0.3	1.3	1.4
<i>Eucalanus giesbrechti</i>	0.0	—	0.3	0.2	0.2
<i>Euchaeta japonica</i>	0.0	—	0.0	0.3	0.5
<i>Metridia lucens</i>	1.6	—	1.6	16.9	22.1
<i>Oithona</i> sp.	59.2	12.2	67.4	54.6	22.5
<i>Oncaea</i> sp.	0.0	4.3	3.1	3.9	14.2
Others	38.9	82.9	27.6	23.3	39.7

Above all, the most important species, excepting copepods, are *Aglantha digitale* HAECKEL in Hydromedusa, *Concoecia* sp. in Ostracoda, *Euphausia pacifica* HANSEN in Schizopoda, *Limacina helicina* and *Clione limacina* in Pteropoda, *Sagitta elegans* VERRILL in Chaetognatha and *Oikopleura* sp. in Tunicata. Besides the species listed in Table 2, the following species of copepods are noticeable: *Calanus cristatus* KRÖYER was found one or two individuals at three stations, *Scorechithricella minor* (BRADY) and some individuals of *Bradyidius armatus* were found at St. 5.

All of these cold water species, found commonly in the surface water of Liman Current and "Oyashio", are never seen in samples hauled up from the layer shallower than 50 m. The sample from St. 2 (off Kyôga-misaki) contains a number of warm water forms as in surface hauls, besides the cold water forms.

In the following, a brief note is given on each noticeable cold water form, although the details on Crustacea is reserved in a future paper.

- a) *Aglantha digitale*, the most important species in cold water Hydromedusae in Japan, occurred always with some Siphonophora in a considerable number at all stations excepting St. 2, where no Siphonophora was found.
- b) *Limacina helicina*, a cold water pteropod, was abundantly found at St. 2 in August. In other stations, it was not so matured as in St. 2, and in rather small numbers.
- c) *Clione limacina*, a cold water pteropod, occurred in a few number in samples from St. 1.
- d) *Sagitta elegans* was found plentifully in the deeper layer off Kasumi in May. but in August it was rather rare. In other stations, this species was found mingled with some warm oceanic species and in a few number. Some individuals fully matured, but most of them were immature. In identifying these young indi-

viduals I am indebted much to Dr. T. TOKIOKA of the Seto Marine Biological Laboratory.

Besides, the occurrence of *Oikopleura labradoriensis* LOHMANN in the deep waters near the New Yamoto Bank (TOKIOKA, 1951) must be noticed.

Thus, it may be summarized safely from the above-mentioned data that the deep waters off San'in district contains many cold water animal planktons, and this phenomenon is especially remarkable at stations off Kasumi.

Before conclusion, the author wishes to express his hearty thanks to Dr. T. TOKIOKA for his valuable advices and generous help throughout this work, and also he is indebted to Mr. S. FUKASE of Nagasaki Marine Observatory, and to the crew on board the "Kuroshio-maru".

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